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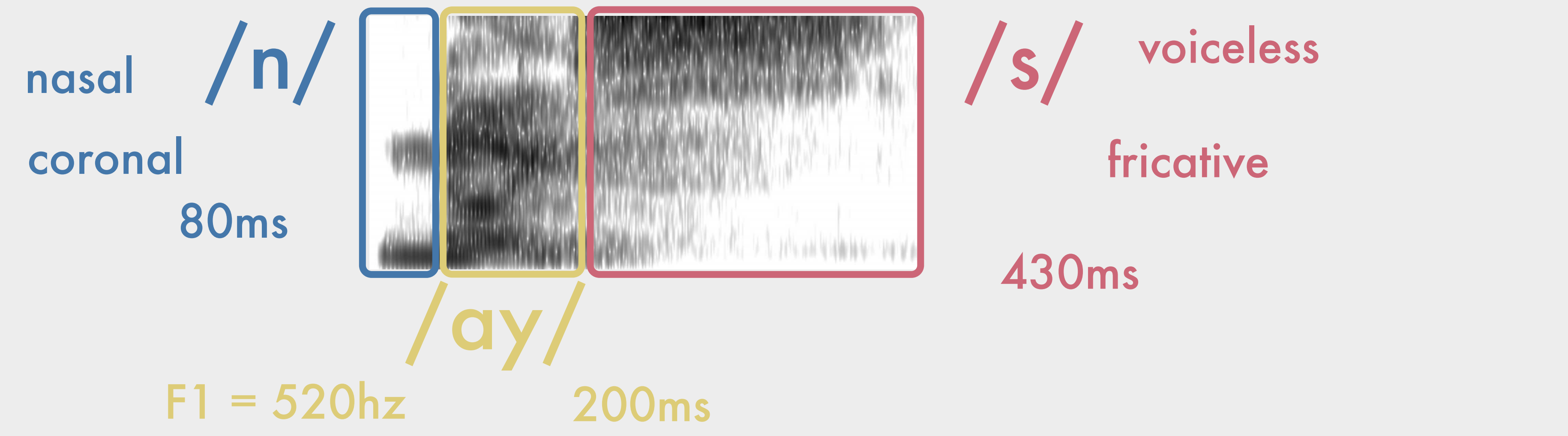
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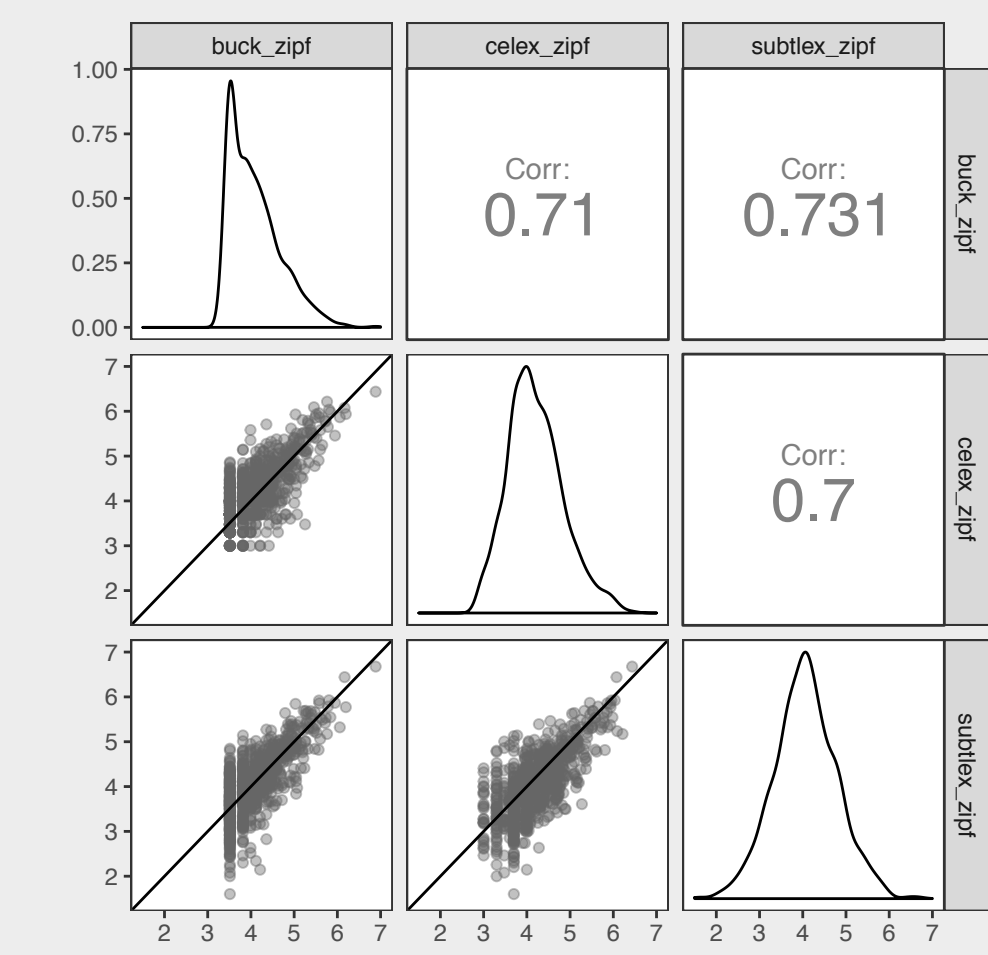


Choice of Word Frequency Norms can Dramatically Effect Inference.

Some factors influencing variation are observable, and others must be estimated. Different estimates may be correlated,



- NICE
- valence
 - lexical neighborhood density
 - frequency



but are they interchangeable?

Case study 1: TD Deletion

TD Deletion Data: Monomorphemes
west [west] ~ [wes]
child [tʃaɪld] ~ [tʃaɪl]

Frequency Norms: Zipf Scaled
log₁₀(frequency per million words) + 3

Model
td ~ zipfscore + (1 | Word) + (zipfscore | Speaker)

Buckeye Corpus 6,691 Tokens			Philadelphia Neighborhood Corpus 18,236 Tokens		
Frequency Norm	Estimated Effect	x Within Corpus	Frequency Norm	Estimated Effect	x Within Corpus
Within Corpus	-0.29		Within Corpus	-0.599	
Celex	-0.15	0.52	Celex	-0.006	0.01
Subtlex	-0.10	0.34	Subtlex	-0.302	0.51

Discussion

The three different frequency norms result in very different estimated frequency effects. The within corpus frequency norm estimated a frequency effect twice to 100 times the size of the others.

Case study 2: /ay/ raising

/Data: /ay/ Raising from the PNC
right [raɪt] ~ [raɪt]
nice [naɪs] ~ [naɪs]
18,608 F1 Estimates

Model:
F1 ~ decade * zipfscore + (decade | Word) + (zipfscore | Speaker)

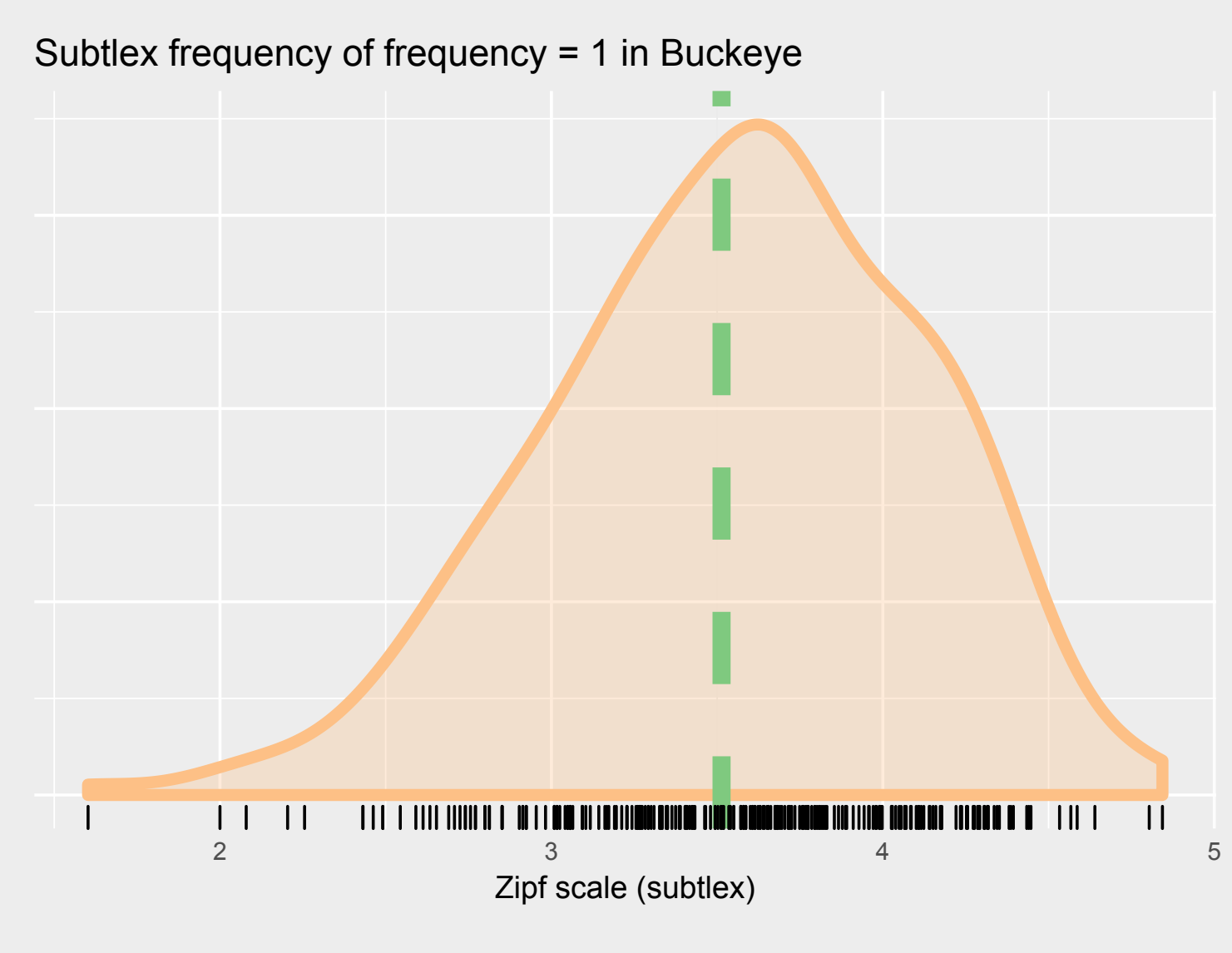
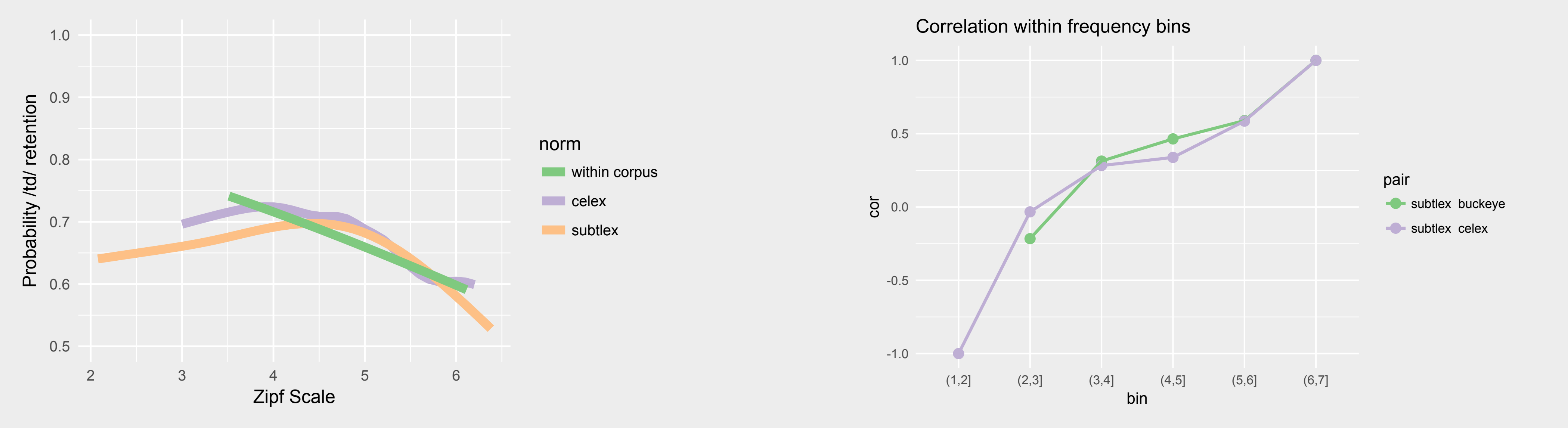
Within Corpus			Celex			Subtlex		
	estimate	CI		estimate	CI		estimate	CI
intercept	0.68	(0.6, 0.76)	intercept	0.64	(0.57, 0.71)	intercept	0.67	(0.6, 0.74)
decade	-0.12	(-0.13, -0.10)	decade	-0.12	(-0.13, -0.10)	decade	-0.12	(-0.13, -0.10)
freq	-0.03	(-0.09, 0.04)	freq	-0.09	(-0.15, -0.01)	freq	-0.05	(-0.12, 0.02)
decade:freq	-0.006	(-0.01, 0.01)	decade:freq	-0.001	(-0.01, 0.01)	decade:freq	-0.0003	(-0.01, 0.01)

Discussion

This time, the within-corpus frequency norm estimates the smallest frequency effect, but two of the norms don't have a reliable effect, while the remaining one does.

Why the differences?

The biggest difference between these norms is their estimates of low frequency words. Recommendation: Use the norms with the best low frequency word estimates.



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